

REMARKS

Claims 1 and 3-14 are pending. By this Amendment, it is proposed to amend claims to change “in tact” to “intact” to correct a spelling error as suggested by the Office Action. By this Amendment, it is also proposed that claim 1 be amended to specify “all of the ions of the dopants of a polarity type defining the channel-shaped semiconductor regions being implanted through the gate dielectric” and that claim 4 be amended to specify “implanting all of the dopant ions of a polarity type defining the channels through the gate dielectric.”

1. It is respectfully submitted that the finality of the present Office Action is premature. Claims 7 and 8 have been rejected for the first time in the present Office Action. It is improper to make final a first rejection of a claim. Accordingly, the Patent Office is urged to withdraw the finality of the present Office Action, enter the amendments to claims 1 and 4 (and also claims 9, 10, 13 and 14), and reconsider the claims of the application.

The present Office Action asserts that “[i]t was clear that in the office action mailed 1/9/04 claims 7 and 8 are addressed in the rejection of claims 1-6” and that “[t]he omission was clearly a typographical error.” To the contrary, the 1/9/04 Office Action does not make clear that claims 7 and 8 are rejected as part of the rejection of claims 1-6. The Office Action does not appear to have examined these claims at the time of the 1/9/04 Office Action. Furthermore, it is respectfully submitted that a first action final rejection cannot be based on a post-dated assertion that a typographical error is responsible for failing to reject a claim in an earlier Office Action.

2. The Office Action rejects claims 1 and 3-14 under 35 U.S.C. §103(a) as being unpatentable over the combination of U.S. Patent No. 3,699,646 to Vadasz and U.S. Patent No. 5,702,971 to Stevens. If applicable to the present claims, this rejection is respectfully traversed.

3. As to claims 1 and 5, Vadasz in view of Stevens does not disclose, teach or suggest a method that deposits a silicon nitride layer using low pressure chemical vapor deposition. The Office Action states that the deposition process, applicable to silicon nitride,

taught by Vadasz is based on a vacuum process, and then, asserts that the “Applicant has not established that LPCVD is limited to any particular pressure range other than vacuum conditions.”

It is respectfully submitted that this assertion has no relevance to the rejection of the claims since it is the burden of the Patent Office to establish a *prima facie* case of obviousness. The Office Action simply fails to establish a *prima facie* case that Vadasz in view of Stevens discloses a low pressure chemical vapor deposition process. The U.S. Patent and Trademark Office bears the initial burden of establishing that the claimed invention is *prima facie* obvious. *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). M.P.E.P. 4142 instructs that the “examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness.”

Low pressure necessarily precludes a meaning that encompasses a vacuum according to the ordinary and customary meaning of the words. The Office Action has failed to establish a *prima facie* case that the ordinary and customary meaning of these words require any meaning to the contrary. The patent law indulges a “heavy presumption” that the claim terms carry their ordinary and customary meaning. *Johnson Worldwide Assocs. v. Zebco Corp.*, 175 F.3d 985, 989 (Fed. Cir. 1999). The ordinary and customary meaning of a claim term to one of ordinary skill in the art may be ascertained from a variety of sources, first, as *Vitronics* instructs, from the intrinsic evidence of record such as the claims themselves, the written description, and the prosecution history, but also from the “common understanding” of the terms that may be reflected in dictionaries, encyclopedias, and treatises. 90 F.3d at 1582; *Tex. Digital Sys., Inc. v. Telegenix, Inc.*, 308 F.3d 1193, 1203 (Fed. Cir. 2002); *Ferguson Beauregard v. Mega Sys., LLC*, 350 F.3d 1327, 1338 (Fed. Cir. 2003). While dictionaries may be used to ascertain the plain and ordinary meaning of claim terms, the intrinsic record is used to resolve ambiguity in claim language or, where it is clear, trump inconsistent dictionary definitions. *Kumar v. Ovonic Battery Co., Inc.*, 351 F.3d 1364, 1367-68 (Fed. Cir. 2003) (quoting *Tex. Digital Sys.*, 308 F.3d at 1204 (Fed. Cir. 2002)). The ordinary and customary meaning of “low pressure” precludes a meaning that encompasses a vacuum.

Accordingly, at least because Vadasz in view of Stevens does not disclose, teach or suggest a method that deposits a silicon nitride layer using low pressure chemical vapor deposition, withdrawal of the rejection of claims 1 and 5 and all claims dependent thereon is respectfully requested.

4. With respect to claims 1 and 3-14, the May 19 Office Action refers back to the January 9 Office Action by stating the “rejection is maintained as stated to be applied to claims 1-6 in the paper mailed 1/9/04.” The January 9 Office then asserts that “Stevens discloses formation of buried channel regions 35 by implantation through gate dielectric 14.” This assertion is respectfully traversed. Stevens does not disclose implantation through the gate dielectric 14 (or 13 for that matter). In fact, Stevens is silent on whether the implantation occurs through the gate dielectric or whether the gate dielectric is formed after implantation. The implantation may even occur after the oxide layer is formed but before a nitride layer is formed.

5. Furthermore, Vadasz in view of Stevens does not disclose, teach or suggest a method in which “all of the ions of the dopants of a polarity type defining the channel-shaped semiconductor regions being implanted through the gate dielectric” as specified in claim 1, upon entry of the amendment to claim 1, and therefore contained in all claims dependent thereon. In Stevens, the same dopant ion polarity type is used for both antiblooming implant 16 and buried channel implant 35. Stevens does not disclose, teach or suggest that the antiblooming channel implant 16 is made after the formation of, and therefore through, oxide 13 or dielectric layer 14. Therefore, withdrawal of the rejection of claim 1 and all claims dependent thereon is respectfully requested.

6. Similarly, Vadasz in view of Stevens does not disclose, teach or suggest a method that includes “implanting all of the dopant ions of a polarity type defining the channels through the gate dielectric” as specified in claim 4 upon entry of the amendment to claim 4, and therefore contained in all claims dependent thereon. Thus, for the same reasons discussed above

with respect to claim 1, withdrawal is respectfully requested of the rejection of claim 4 and all claims dependent thereon.

7. As to claims 9, 10, 12 and 13, Vadasz in view of Stevens does not disclose, teach or suggest a method where “the gate dielectric is formed before any other dielectric layer is formed in an active area of the image sensor” as specified in claims 9 and therefore contained in claim 10 dependent on claim 9 and as specified in claims 12 and therefore contained in claim 13 dependent on claim 12. Neither Stevens nor Vadasz disclose that all depositions and subsequent removal of dielectric layers in the active area of the image sensor are done after the formation of the gate dielectric and that the gate dielectric is kept intact after its deposition.

8. As to claims 10 and 13, Vadasz in view of Stevens does not disclose, teach or suggest at method where “the gate dielectric is kept intact after the gate dielectric layer is formed” as specified in claims 10 and 13.

9. As to claims 11 and 14, Vadasz in view of Stevens does not disclose, teach or suggest at method where “the gate dielectric is kept intact during any subsequent process that one of deposits a dielectric layer in the active area of the image sensor and removes a dielectric layer in the active area of the image sensor” as specified in claims 11 and 14.

10. Additionally, the Applicant maintains that Vadasz is non-analogous art to the present application and is not combinable with Stevens. In response to the Applicants’ position that Stevens is non-analogous art to Vadasz, the Office Action asserts that the Vadasz and Stevens are analogous art because they both address gate dielectric formation using oxide and nitride layers. It is respectfully submitted that this is not the legal standard for analogous art, and that the Office Action’s position is too general as discussed further below. According to section 2145 of the M.P.E.P., a “prior art reference is analogous if the reference is in the field of applicant’s endeavor or, if not, the reference is reasonably pertinent to the particular problem

with which the inventor was concerned. *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992)."

Vadasz is in a different field of endeavor to that of the Applicants invention. In particular, Vadasz is in the field of field-effect transistors, different than the field of CCD image sensors as discussed in the present application. Furthermore, Vadasz is not reasonably pertinent to the particular problem with which the inventor was concerned. The present Applicants are concerned with a method of making a CCD image sensor by implanting dopant ions through a gate dielectric. In contrast, Vadasz addresses the general problem of higher density and better yields in the making of semiconductor integrated circuits (see column 2, lines 20-24) with field-effect transistors by exposing a portion of the semiconductor body to make a contact prior to forming any device or any element of a device (see column 2, lines 28-32). This is a different particular problem. Accordingly, Vadasz is not analogous art to the present application.

M.P.E.P. section 2141.01(a) discusses a non-analogous art analysis in the case of *Wang Laboratories, Inc. v. Toshiba Corp.*, 993 F.2d 858, 26 USPQ2d 1767 (Fed. Cir. 1993). The M.P.E.P. instructs "Patent claims were directed to single in-line memory modules (SIMMs) for installation on a printed circuit motherboard for use in personal computers. Reference to a SIMM for an industrial controller was not necessarily in the same field of endeavor as the claimed subject matter merely because it related to memories. Reference was found to be in a different field of endeavor because it involved memory circuits in which modules of varying sizes may be added or replaced, whereas the claimed invention involved compact modular memories. Furthermore, since memory modules of the claims at issue were intended for personal computers and used dynamic random-access-memories, whereas reference SIMM was developed for use in large industrial machine controllers and only taught the use of static random-access-memories or read-only-memories, the finding that the reference was nonanalogous was supported by substantial evidence."

The position of the present Office Action is that the references are analogous because they use an oxide and nitride gate dielectric. It is respectfully submitted that this asserted reason for finding the references to be analogous is too broad. It would label as analogous all sorts of

references in all technologies involving FETs, p-MOS, n-MOS, CMOS and CCDs. Such a scope is overly broad. It is not reasonable to expect persons of ordinary skill in the art to be knowledgeable of all of these references. The Office Action's assertion of analogy is rather like the attempt to try to assert that all references involving memories are analogous as discussed above with respect to *Wang Laboratories, Inc. v. Toshiba Corp.* All references discussing memories were not analogous in *Wang*, and in the same way, all references discussing gate dielectrics are not analogous to the present application.

11. Furthermore, the Applicant maintains the position that the Office Action fails to establish a *prima facie* case of obviousness at least because the Office Action fails to establish or proffer evidence of a reason or suggestion why an ordinarily skilled person would have been motivated to combine the references in the way suggested.

The May 19 Office Action merely asserts that the combination of art applied in the rejection of the present claims is sufficiently analogous to the situation discussed in M.P.E.P. section 2144.07 "to justify application of the logic to the instant fact situation." It was the January 9 Office Action that first cited M.P.E.P. section 2144.07 and asserted as motivation to combine the references "because one of ordinary skill in the art would have been motivated to look to analogous art teaching suitable or useful methods of performing the disclosed gate dielectric formation step of Stevens."

Even if, *arguendo*, an art recognized suitability to use LPCVD formed nitride layer in a gate dielectric justifies "application of the logic [of M.P.E.P. section 2144.07] to the instant fact situation" (in the language of the Office Action), the logic itself is nothing more than argument, analysis or assertions of the Patent Office. This logic is not evidence. Evidence of such art recognized suitability requires a teaching of the underlying facts to be found in a prior art reference. "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)." See M.P.E.P., section 2143.01, page 2100-98, Rev. 1, Feb. 2000, 7th Ed (emphasis in the original).

Establishment of a suggestion or incentive to modify or combine prior art references requires substantial evidence of such suggestion or incentive. “The factual question of motivation is material to patentability, and could not be resolved on subjective belief of unknown authority,” *In re Lee*, 61 USPQ2d 1430 (Fed. Cir. 2002). Office Action assertions of such art recognized suitability as a substitute for the required suggestion or motivation, without evidentiary support, is merely subjective belief and is insufficient to constitute substantial evidence upon which a legal conclusion can be based. The Patent Office can satisfy its burden of showing the obviousness of the combination “only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references,” *In re Fitch*, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992).

Furthermore, motivation must be found with specificity. “[P]articular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention would have selected these components for combination in the manner claimed,” *In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). “[E]ven when the level of skill in the art is high, the Board must identify specifically the principle, known to one of ordinary skill, that suggests the claimed combination. In other words, the Board must explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious,” *In re Rouffet*, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed. Cir. 1998).

CONCLUSION

In view of the present amendments and remarks, withdrawal of the rejection of the claims is earnestly solicited. The combination of features has important and surprising advantages. It is respectfully submitted that the present application is in condition for allowance. Prompt reconsideration and allowance of the application are earnestly solicited. Should the examiner believe that any further action is necessary to place the application in condition for allowance,

Appl. No. 09/888,463
Reply to Office Action of May 19, 2004

the examiner is invited to contact the undersigned applicant representative at the telephone number listed below.

The Commissioner is hereby authorized to charge any fees (or credit any overpayment) associated with this communication to Deposit Account No. 13-3402

Respectfully submitted,
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